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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/894,422	06/28/2001	Michael H. Wright	EMC-038PUS	6882
51576 7590 08/09/2007 EMC CORPORATION c/o DALY, CROWLEY, MOFFORD & DURKEE, LLP 354ATURNPIKE STREET SUITE 301A CANTON, MA 02021-2714			EXAMINER DUONG, THOMAS	
			ART UNIT 2145	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/894,422	Applicant(s) WRIGHT ET AL.	
	Examiner Thomas Duong	Art Unit 2145	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-68 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28-68 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This office action is in response to the Applicants' After Non-Final Amendment filed on April 5, 2007. *Claims 28-68* are presented for further consideration and examination.
2. In view of the After Non-Final Amendment filed on April 5, 2007, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

Response to Argument

3. Applicants' argument, see pg.14-18, filed on April 5, 2007, with respect to *claims 28-68* have been fully considered and are persuasive. The previous rejection is withdrawn. New grounds of rejection are set forth below.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. *Claims 28-29, 32, 45-46, 49, 56, 61, and 66* are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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6. With regards to claims 28-29, 32, 45-46, 49, 56, 61, and 66, Applicant recites the limitations,

- "substantially identical" (claims 28, 45, and 56)
- "substantially independent" (claims 29 and 46)
- "a substantial copy" (claims 32 and 49)
- "substantially the same" (claims 61 and 66)

The terms specified in the above claims are relative terms which render the claims indefinite. The term above are not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Please clarify the language of the above claims.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 28, 45, and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kleiman et al. (US006574591B1) and in view of Kleiman et al. (US006604118B2).

9. With regard to claims 28, 45, and 56, Kleiman '591 discloses,

- *discovering logical information related to the one or more volumes of data that are part of the first volume group on the first computer system;* (Kleiman '591, col.1, line 10 – col.13, line 60)

Kleiman discloses, *"One preferred embodiment determines a first set of block numbers (BNs), determines where the storage blocks referenced by these BNs are to be stored, and updates the BNs accordingly"* (Kleiman '591, col.1, lines 61-64). Hence, Kleiman teaches of determining (i.e., Applicants' discovering) a first set of block numbers (BNs) (i.e., Applicants' logical information). Kleiman discloses, *"A preferred embodiment uses BNs that are within a volume block number (VBN) space. VBNs provide a contiguous flat address space for the storage blocks"* (Kleiman '591, col.4, lines 38-40). Hence, Kleiman teaches of the BNs (i.e., Applicants' logical information) belonged (i.e., Applicants' related) within a volume block number (VBN) space (i.e., Applicants' one or more volumes of data that are part of the first volume group).

- *creating a map of the logical information to physical devices on the first computer system, the map comprising:* (Kleiman '591, col.1, line 10 – col.13, line 60)

Kleiman discloses, *"The 'generate image stream' procedure 203 may also generate one or more block-lists that specify where storage blocks from the source file system are included in the image stream. The block-lists can indicate which storage blocks include one or more block number (BN) pointers. The data read from the source file system includes one or more block number (BN) pointers. The 'generate image stream' procedure 203 can also include a second block-list that can be used to map blocks in the image stream to a second storage block arrangement for the destination file system"* (Kleiman '591, col.5,

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lines 6-15). Hence, Kleiman teaches of block-lists (i.e., Applicants' map) indicating which storage blocks from the source file system (i.e., Applicants' physical devices on the first computer) are associated with the one or more block number (BN) pointers (i.e., Applicants' logical information).

- *information identifying one or more devices associated with one or more physical volumes containing the data; and* (Kleiman '591, col.1, line 10 – col.13, line 60)

Kleiman discloses, *"The block-lists can indicate which storage blocks include one or more block number (BN) pointers. The data read from the source file system includes one or more block number (BN) pointers"* (Kleiman '591, col.5, lines 9-12). Kleiman discloses, *"A preferred embodiment uses BNs that are within a volume block number (VBN) space. VBNs provide a contiguous flat address space for the storage blocks"* (Kleiman '591, col.4, lines 38-40). Hence, Kleiman teaches of block-lists (i.e., Applicants' map) containing information associating the storage blocks (i.e., Applicants' physical devices) with the volume block number space (i.e., Applicants' one or more physical volumes).

- *information providing definition and structured layout of volume groups, internal logical volumes and file systems on the first computer system;* (Kleiman '591, col.1, line 10 – col.13, line 60)

Kleiman discloses, *"Another preferred embodiment reads data from the source file system (in accordance with a first storage block arrangement) creates an image stream"* (Kleiman '591, col.1, lines 64-66). Kleiman discloses, *"A preferred embodiment uses BNs that are within a volume block*

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number (VBN) space. VBNs provide a contiguous flat address space for the storage blocks” (Kleiman ‘591, col.4, lines 38-40). Hence, Kleiman teaches of reading data from the source (i.e., Applicants’ first computer system) file system in accordance with a first storage block arrangement (i.e., Applicants’ internal logical volumes and file systems) and volume block number space (i.e., Applicants’ structured layout of volume groups).

- *using the map to create a second volume group on a second computer system having a second operating system, where the logical configuration of the second volume group is substantially identical to the logical configuration of the first volume group; and (Kleiman ‘591, col.1, line 10 – col.13, line 60)*

Kleiman discloses, *“Another preferred embodiment reads data from the source file system (in accordance with a first storage block arrangement) creates an image stream and writes the data from the image stream onto the destination file system (in accordance with a second storage block arrangement)” (Kleiman ‘591, col.1, line 64 col.2, line 2). Hence, Kleiman teaches of reading data from the source (i.e., Applicants’ first computer system) file system in accordance with a first storage block arrangement (i.e., Applicants’ internal logical volumes and file systems) and writing the data from the image stream onto the destination (i.e., Applicants’ second computer system) file system in accordance with a second storage block arrangement.*

However, Kleiman ‘591 does not explicitly disclose,

- *using the map to create a second volume group on a second computer system having a second operating system, where the logical configuration of the second*

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volume group is substantially identical to the logical configuration of the first volume group; and

- *using the map to reconstruct on the second computer system the internal logical volumes and file systems of the first computer system and mount a duplicate of the one or more volumes of data on the second computer system.*

Kleiman '118 teaches,

- *using the map to create a second volume group on a second computer system having a second operating system, where the logical configuration of the second volume group is substantially identical to the logical configuration of the first volume group; and* (Kleiman '118, col.1, line 5 – col.17, line 62)

Kleiman discloses, "Select a storage image 220, in response to a first file system (or a snapshot thereof) to have an operation performed thereon. Form an image stream 230 in response to the storage image 220. Perform an operation on the image stream 230, such as backup or restore within the first file system, or copying or transfer to a second file system" (Kleiman '118, col.14, lines 10-18).

Hence, Kleiman teaches of selecting a storage image (i.e., Applicants' first volume group) of the first file system (i.e., Applicants' first file system) and copying or transferring (i.e., Applicants' creating) to a second file system (i.e., Applicants' second operating system) on a second file server.

- *using the map to reconstruct on the second computer system the internal logical volumes and file systems of the first computer system and mount a duplicate of the one or more volumes of data on the second computer system. (Kleiman '118, col.1, line 5 – col.17, line 62)*

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Kleiman discloses, *"Select a storage image 220, in response to a first file system (or a snapshot thereof) to have an operation performed thereon. Form an image stream 230 in response to the storage image 220. Perform an operation on the image stream 230, such as backup or restore within the first file system, or copying or transfer to a second file system"* (Kleiman '118, col.14, lines 10-18).

Hence, Kleiman teaches of selecting a storage image (i.e., Applicants' first volume group) of the first file system (i.e., Applicants' first file system) and copying or transferring (i.e., Applicants' creating) to a second file system (i.e., Applicants' second operating system) on a second file server.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Kleiman '118 with the teachings of Kleiman '591 to *"[provide] techniques for duplicating all or part of a file system while maintaining consistent copies of the file system"* (Kleiman '591, col.1, lines 59-61). Kleiman discloses, *"Accordingly, it would be desirable to provide a method and system for duplicating all or part of a file system, which can operate with any type of storage medium without either relative complexity or expense, and which can provide all the known functions for data backup and restore. This advantage is achieved in an embodiment of the invention in which consistent copies of the file system are maintained, so those consistent snapshots can be transferred at a storage block level using the file server's own block level operations"* (Kleiman '118, col.1, lines 37-46).

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10. Claims 29-44, 46-55, and 57-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kleiman et al. (US006574591B1), in view of Kleiman et al. (US006604118B2), and further in view of Markson et al. (US 20020103889A1).
11. With regard to claims 29-30, Kleiman '591 and Kleiman '118 disclose,
- See *claim 28* rejection as detailed above.
- However, Kleiman '591 and Kleiman '118 do not explicitly disclose,
- *wherein the first and second operating system are selected from the group consisting of IBM AIX, Sun Solaris, or HP UX, and the computer-executed steps may be performed substantially independent of which operating system is selected from the group.*
 - *wherein the map is configured as a flat file that is converted into a tree structure and further comprising the computer-executed step of using the tree structure to verify the accuracy of the information related to the volume group and the other logical information.*
- Markson teaches,
- *wherein the first and second operating system are selected from the group consisting of IBM AIX, Sun Solaris, or HP UX, and the computer-executed steps may be performed substantially independent of which operating system is selected from the group. (Markson, para.84)*
 - *wherein the map is configured as a flat file that is converted into a tree structure and further comprising the computer-executed step of using the tree structure to verify the accuracy of the information related to the volume group and the other logical information. (Markson, para.83-84, 89, 94)*

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Markson with the teachings of Kleiman '591 and Kleiman '118 to "[provide] techniques for duplicating all or part of a file system while maintaining consistent copies of the file system" (Kleiman '591, col.1, lines 59-61). Kleiman discloses, "Accordingly, it would be desirable to provide a method and system for duplicating all or part of a file system, which can operate with any type of storage medium without either relative complexity or expense, and which can provide all the known functions for data backup and restore. This advantage is achieved in an embodiment of the invention in which consistent copies of the file system are maintained, so those consistent snapshots can be transferred at a storage block level using the file server's own block level operations" (Kleiman '118, col.1, lines 37-46). Markson discloses, "Still another problem in this context relates to making back-up copies of data on the storage devices. It would be cumbersome and time-consuming for an operator of a data center to move among multiple data storage locations in order to accomplish a periodic back-up of data stored in the data storage locations. Thus there is a need for a way to provide storage that can be selectively associated with and disassociated from a virtual server farm and also backed up in a practical manner" (Markson, para.11).

12. With regard to claims 31-32, Kleiman '591, Kleiman '118, and Markson disclose,
- wherein the tree structure is converted back into a map that is sent to the second computer system. (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)

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- *further comprising the computer-executed step of building a second volume group on the second computing system that is a substantial copy of the first volume group on the first computing system including volume layout and file system structure as defined by mapping information originally built on the first computer system. (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)*
13. With regard to claims 33-36, Kleiman '591, Kleiman '118, and Markson disclose,
- *further comprising the computer-executed steps of:*
 - *establishing one or more mirrored copies of data that are copies of one or more volumes of data that are part of the first volume group; and (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)*
 - *separating the one or more mirrored copies of data from the respective one or more volumes of data. (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)*
 - *further comprising the computer-executed step of mounting the separated one or more mirrored copies of data on the first or second computer system using the second volume group. (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)*
 - *wherein the first and second computer system are combined. (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)*
 - *further comprising the computer-executed step of:*

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- *dismounting the separated one or more mirrored copies from the second computer system.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)

14. With regard to claims 37-38, Kleiman '591, Kleiman '118, and Markson disclose,

- *further comprising the computer-executed step of:*
 - *backing up the separated one or more mirrored copies of data to a backup medium.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
- *further comprising the computer-executed step of:*
 - *restoring one or more volumes of data from the backup medium or from the one or more mirrored copies of data that are copies of the one or more volumes of data.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)

15. With regard to claims 39-44, Kleiman '591, Kleiman '118, and Markson disclose,

- *wherein the respective one or more volumes of data that are part of a first volume group on the first computer system are further associated with a first software application.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
- *wherein a second software application is provided on the second computer system and the separated one or more mirrored copies of data on the second computer system are associated with the second software application.* (Kleiman

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'591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)

- *further comprising the computer-executed step of:*
 - *backing up the separated one or more mirrored copies of data to a backup medium. (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)*
- *wherein the second software application has an associated database and the step of backing up the separated one or more mirrored copies of data to a backup medium includes backing up the associated database. (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)*
- *wherein there is a set of information associated with the database, the set of information comprising at least one type of information selected from the group consisting of tablespaces, archive logs, redo logs, and control files, and wherein at least some of the set of information associated with the database is backed up to the backup medium during the backup step. (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)*
- *further comprising the step of:*
 - *restoring, from the separated one or more mirrored copies of data, the respective one or more volumes of data associated with the separated one or more mirrored copies of data, and wherein at least some of the set of information associated with the database is used during this step. (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)*

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16. With regard to claims 46-55, they are rejected with the same rational as claims 29-38, because they have similar limitations as claims 29-38.
17. With regard to claims 57-58 and 67-68, Kleiman '591, Kleiman '118, and Markson disclose,
- *wherein the map further comprises: information identifying the one or more separated mirrored copies of the data; and information identifying the physical address(es) of the mirrored copies.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
 - *wherein the first operating system is different from the second operating system.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
18. With regard to claims 59-63, Kleiman '591, Kleiman '118, and Markson disclose,
- *wherein the map further comprises at least one set of information selected from the group consisting of information relating to one or more filesystems associated with the volumes of data, device serial number, physical address, volume group, logical volume name, file type, and mount point.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
 - *wherein the first operating system is different from the second operating system.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)

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- *wherein the first operating system is substantially the same as the second operating system.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
 - *wherein the first computer system is a separate and distinct computer system from the second computer system.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
 - *further comprising creating volume group, logical volume, and file system objects on the second computer system.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
19. With regard to claims 64-66, Kleiman '591, Kleiman '118, and Markson disclose,
- *wherein the map further comprises: information identifying the one or more separated mirrored copies of the data; and information identifying the physical address(es) of the mirrored copies.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
 - *wherein the first operating system is different from the second operating system.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)
 - *wherein the first operating system is substantially the same as the second operating system.* (Kleiman '591, col.1, line 10 – col.13, line 60; Kleiman '118, col.1, line 5 – col.17, line 62; Markson, para.1-214)

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Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas Duong whose telephone number is 571/272-3911. The examiner can normally be reached on M-F 7:30AM - 4:00PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason D. Cardone can be reached on 571/272-3933. The fax phone numbers for the organization where this application or proceeding is assigned are 571/273-8300 for regular communications and 571/273-8300 for After Final communications.

Thomas Duong (AU2145)

August 3, 2007



Jason D. Cardone

Supervisory PE (AU2145)